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ABSTRACT

An introductory course was developed for the Dutch Open University. Because the course was intended for adult distance learners, it was designed to be suitable for self-instruction in 200 hours or less. No suitable Dutch-language psychology text could be found; consequently, the course was based on the translation of a recent American book, "Psychology," by Henry Gleitman (1986). Supplementary materials relevant for Dutch students were also developed along with an audiocassette summary of the English text recorded by a native speaker of English, a video production concerning the biological aspects of behavior, and a filmed discussion between the U.S. author and two Dutch psychologists. A study guide that included an introduction, learning objectives, hints, assignments, exercises, diagnostic tests, summative test, feedback, audiovisual aids, and final examination was also developed. The new course was then subjected to a formative evaluation. Evaluation questionnaires were mailed to a random sample of 400 of the 1,814 Netherlands residents who had begun the course. Most of the 59% of students who responded to the questionnaire were positive in their evaluation of the new course. However, only limited use was being made of the audiovisual materials. (Twelve references and the questionnaire are included.) (MN)

The Development and Evaluation of a Psychology Course for Adult Distance Education

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Running Head: Course Development and Evaluation

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Abstract

The first part of this paper deals with the development of an introductory psychology course for the Dutch Open University. Use was made of (a) a strategy involving systematic design activities and (b) the features of a powerful teaching-learning environment. In the second part of the paper a description is given of a formative evaluation of this course. For this purpose a random sample of 400 students completed a questionnaire asking them to evaluate: course content; arrangement of course material; level of difficulty; expectations for the course; opportunities to monitor one's own progress; self-instruction strategies; usefulness of the study guide; use of prior knowledge related to the course; and workload. The responses to most of these questions were positive. It appears, however, that students make only limited use of audio-visual aids. The students who do use this material are not positive about its effectiveness. The nominal workload is exceeded amply. Students prefer an integration of the textbook and the study guide.

The Development and Evaluation of a Course for Adult Distance Education

The Open University of the Netherlands is an institute of higher education providing distance teaching for adults. Applicants must be at least 18 years old to be admitted. Admission is "open"; in other words, there are no admission requirements with respect to prior schooling. Students may begin at various entry levels. It has long been known that prior knowledge accounts for most of the variance in student achievement (Dochy, 1992). For learning theoretical reasons an adequate level of prior knowledge is desirable; however, it is not necessary to start studying at the Open University. The course material is designed in such a way that domainspecific prior knowledge is not explicitly imperative. Therefore, prior knowledge is no prerequisite for completing a particular course successfully. In order to complete courses successfully, however, they must have some knowledge of the subjects they intend to study.

The subject matter is presented in study material in the broadest sense of the word: books, demonstrations, practicals, computer simulations, etc. Because the Open University is an institute of distance education, students must be able to learn the subject matter without the help of an instructor. Obviously those who design courses must first of all focus a great deal of attention on course content; secondly, they must be careful to build in instructional features that suit the relevant subject matter and can replace instructors in their teaching role; and

thirdly, they must concentrate on developing course material.

In this article we will begin by describing briefly the various phases of the design strategy that we believe course designers should apply when developing course material. By means of this simple design strategy we will next explore how a group of course designers developed an introductory course in psychology. Then a few of the educational features of the Open University will be described. Finally, we will describe in some detail a phase in this strategy focusing on course evaluation.

A Minimal Systematic Design Strategy

In the following we will briefly describe a systematic design strategy consisting of five consecutive phases. This same strategy was used to design a psychology course. The phases are: 1) the exploratory or pilot study phase; 2) the design phase; 3) the realization phase; 4) the evaluation phase; and 5) the implementation phase. (For a detailed description of both this strategy and the general systematic approach model for problem-solving, see Van der Wolde, 1990).

Design strategies may naturally include a greater number of phases, and each phase may involve a greater number of activities (Andrews and Goodson, 1980). However, a minimal design strategy should at the very least consist of the five phases mentioned above.

Before course designers can begin to design a course in a particular field of study, they must perform a number of exploratory phase activities. First, they must describe the preconditions. Second, an outline should be made of what is

required in that particular domain. Before course material is developed, complete agreement must be reached on the necessary content of the learning material.

In this phase, the problem can be described in terms of a discrepancy between the actual situation (no introductory psychology course exists) and the desired situation (an introductory psychology course is available that meets the specified requirements). The course designers will need to analyze the context of the problem, or rather the situation in which it occurs. By describing the problem and analyzing the context, they are able to establish provisional criteria against which they can test every potential solution.
Both the objectives set for the course and the knowledge already available in the relevant field serve as guidelines for a course proposal. This proposal is the blueprint upon which the course is based.

In the design phase the designers perform a number of activities in sequence. Their description of the problem is the point of departure for realizing the solution they have chosen. Important activities in this phase include generating alternative solutions and comparing and contrasting these alternatives. Performing these activities helps the designers choose the best design given the existing circumstances and preconditions. The design phase activities culminate in a working document establishing clear guidelines for a prototype course. The importance of this phase lies in the articulation of course objectives and theoretical points of departure. These are of

secondary importance in the actual course material -syllabi, computer programs, video programs, etc.- used by the students, as they are not necessarily interested in the scholarly and theoretical arguments underlying the course. The designers, however, are not only interested in the product; they are equally interested in the rationale behind the product's design (Van der Sijde & Tomic, 1987).

The course designers develop the components of the course or program based on the design or blueprint of their chosen solution. An interaction will take place between the blueprint of the solution and its realization. Unavoidably they will encounter discrepancies between their solution as given in the blueprint and how this blueprint is realized eventually. Unforeseen problems may arise in the realization phase, leading to changes and adaptations. The prototype or end-product of the realization phase must be tested in practice. Such testing entails submitting the course to the target group -the students- for a trial run and subsequently evaluating the results. In other words, in this phase the course designers must test and evaluate their proposed solution in the context for which it was designed, with an eye to determining whether this solution is indeed adequate or needs improvement. This is a formative evaluation.

The course designers should determine by means of an evaluation study whether the target group displays the recommended behavior, and if so, to what degree. (We give an example of an item in the questionnaire: 'Does the final exam include items that might be expected on the basis of the

summaries, diagnostic tests and the summative test?' Only when the results of this study are positive should the course be made available to students. This type of activity usually takes place in the implementation phase of the systematic strategy described above.

This concludes our discussion of the minimal design strategy.

Educational Features

The Dutch Open University has chosen a system of modular instruction in the belief that education might be made more flexible through the use of modules. From the very start, the emphasis was on self-instruction and individual learning.

The course material plays an important role. It consists largely of written texts divided into modules. An instruction module is a complete learning unit consisting of a series of study tasks designed to help students achieve certain well-defined objectives, and rounded off with an evaluation. In modular instruction, the educational program is divided into a number of flexible, multifunctional learning units. Within certain limits students can put together their own programs, determining both the program content and the sequence of the modules.

In addition to the modular nature of the courses, a great deal of attention has been focused on instruction. During the process of instruction, students' characteristics and environmental factors naturally influence each other, allowing the student to gain a new and desired repertoire. If the external information given in the study material is to translate into new

knowledge locked in a student's memory, then cognitive processing of this information must take place. This involves evaluating and (re)structuring the knowledge already present in memory (Resnick, 1984).

The most important factors for the course designers are indirect, external learning conditions, such as the arrangement of the study material and the instructional strategy (Gagné). These factors must naturally be taken into consideration when designing a learning unit.

A learning unit functions independently within a curriculum and consists of study material supplemented by cues and instructions that clarify this material and make it easier to learn (Knoers, 1991). The student gains assistance from the instructional features built into the course design. The result is a form of guided self-study based on a "powerful learning environment." In a powerful learning environment, a student's independent exploration of the material is counterbalanced by the offer of systematic guidance which takes into account his or her individual skills and needs (De Corte, 1990).

A powerful learning environment has a minimum of three features (Knoers, 1991). Firstly, there is a great deal of guidance, but this does not hinder independent processing of the subject matter. Secondly, instruction is highly individualized, being based on the principles of mastery learning, in which feedback plays an important role. Thirdly, the subject matter is divided among rather independent learning sequences, in combination with assignments, problems, feedback, diagnostic

tests and visual cues. Together these make up a study task which in turn forms an integral part of a learning unit.

A powerful learning environment includes instructional features borrowed from both behaviorist and cognitivist approaches in educational psychology. The notion 'powerful learning environment' is explained conceptually in detail; however, there are no supporting empirical results to date.

Those who attend to education must see that a number of instructional tasks are fulfilled. These tasks, to a certain extent comparable with Gagné's (1977) instructional events, include setting learning objectives, motivating students, making the subject matter accessible, helping students process the subject matter, analyzing a student's characteristics and making necessary adjustments, creating an adequate teaching-learning environment, and evaluating and determining results. In contrast with conventional education, where the instructional tasks mentioned above are fulfilled largely by an instructor, in distance education these tasks must be built into the material.

The Srategy as Applied in Practice

The Open University lacked an introductory psychology course within the social sciences curriculum. In the exploratory phase, several preconditions were formulated which had to be met. The course had to cover the entire field of psychology at an introductory academic level. The level of difficulty and content of the course had to be comparable to introductory courses given at traditional universities. The course had to describe recent developments in psychology. The text had to be written in Dutch.

The workload for the students could not exceed 200 hours. The text had to be suitable for self-instruction within the context of adult distance education. As all other Open University courses, this course had to include features of a powerful learning environment: an introduction indicating how the course material is arranged, learning objectives, problems, exercises, diagnostic tests, a summative final test, feedback, and margin texts. Moreover, the course had to fit within the concept of modular education.

To determine the content and subject matter of the course, the course designers sent a questionnaire and talked to psychology instructors at traditional universities. Most of those questioned agreed that the course should devote a considerable amount of space to cognitive psychology. At the same time the biological aspects of behavior should be given a great deal of attention.

The course designers also reviewed existing textbooks relevant to the design of an introductory psychology course. They inspected a large number of introductory psychology textbooks but found no suitable Dutch-language text. Finally they chose a recent American book that met almost all of the requirements with respect to content: Psychology by Henry Gleitman (1986).

Because the Open University sets no formal admission requirements, the course designers were unable to use the American version of this textbook. Not only would it have to be translated, it would also have to be supplemented with material relevant for Dutch students. All of these activities took place

in the exploratory phase of the design strategy.

As the field of psychology uses English as its language of communication, the course designers decided to have a native speaker of English record on audiocassette a summary of the chapters containing terms included in the glossary.

At the same time the designers decided to put together a video production concerning the biological aspects of behavior. They also filmed a discussion between the author of the book, Henry Gleitman, and two Dutch psychologists.

The design or 'blueprint' had to meet the requirements described above. The necessary preparatory activities for designing a solution took place in the exploratory phase.

The design took the form of a written plan -a course plan- which served as the point of departure for the realization phase. The activities of this phase resulted in a textbook and a study guide with the features of a powerful learning environment, namely an introduction, learning objectives, hints, assignments, exercises, diagnostic tests, a summative test, feedback, audio-visual aids and a final examination.

The course was now ready for a formative evaluation.

Course Evaluation

Ideally the course would have been tested and evaluated before being offered to students for study. However, the very tight schedule made it impossible for the course designers to delay implementation until all the evaluative data had been received. There was no possibility of revising the text at that time. Implementation therefore preceded evaluation, contrary to

the sequence of phases laid down in the systematic design strategy. It is often the case that practice does not follow theory. The prototype or end-product of the realization phase should be tested in practice. This entails letting the target group try out the course and subsequently subjecting it to an evaluation. In other words, in this phase the proposed solution should be tested and evaluated in the same context for which it has been designed, with an eye to determining whether it functions adequately or needs improving.

The course designers performed an evaluative study exploring whether, and to what degree, the target group actually achieved the learning objectives set out in the course (Kempkens, 1989). They did this by testing and evaluating the course in the context for which it was designed, in order to determine whether the solution they decided upon was adequate or required improvement. This evaluation was formative, meaning that the designers gathered data on the success or failure of the course with a view to improving it.

In the following section we will review the results of the questionnaire sent to students.

Method

The chosen method consisted of an investigation conducted by means of a questionnaire.

Population, Sample, Response Group, Questionnaire and Data Collection

A random sample of 400 subjects was chosen from a population of 1814 students who had begun the course between 1 January 1988

and 1 January 1989 and who lived in the Netherlands (Table 1). Of this population, 66 per cent were female, 77 per cent were under the age of 41, and 31 per cent had not reached the Dutch HAVO level (Higher General Secondary Education).

The data was obtained by means of a questionnaire. The students completed a list of questions asking them to evaluate: course content; whether the course satisfied their expectations; arrangement of the course material; how various course sections functioned; whether the course allowed them to monitor their own progress; the use of self-instruction strategies in the course; the usefulness of the study guide; the figures given in the margins of the text; the schema and content of the glossary; how representative the final exam was; different sections of the study guide; chapter length; whether the course related to their prior knowledge of the subject; the level of difficulty; the usefulness of the audio-visual aids; the usefulness of the audiocassette; the actual workload; whether the course content required revision. Concerning evaluation the main emphasis was on "acceptability"; most questions refer to it. "Efficiency" is briefly referred to in terms of time spent on study by the respondents, and the use of audio-visual aids.

Students were asked to evaluate the above on a five-point scale ranging from negative to positive. Of the 400 students who were sent the questionnaire, 59 per cent responded (Table 1).

A comparison between the course population and the respondents reveals that the respondents were more likely to be employed, worked longer hours on a weekly basis (> 35 hours) and

studied for work or professional reasons. Their behavior was geared toward obtaining good exam results. They also indicated more frequently that studying at traditional universities would be almost impossible for them. Students with the characteristics mentioned above are overrepresented in the group of respondents. This may have influenced the results obtained from the questionnaire.

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insert Table 1 about here

Results

The students assessed as positive to very positive the course content (94 per cent). In their opinion, the course content satisfied their expectations (69 per cent). Those students with less prior schooling were less satisfied with the content than those with more schooling.

Concerning the arrangement of the course material, the students assessed this as positive (95 per cent). The didactic presentation of the material was also given a positive rating (88.5 per cent). Almost all of the students understood clearly how the various course sections functioned (93 per cent). They felt that the study guide generally gave them enough assistance in studying the texts (79 per cent). A large group of students indicated that the course offered sufficient opportunity to monitor one's own progress in mastering the various course sections (75 per cent). For the most part the students used the separate sections of the study guide almost all the time. In particular the diagnostic tests and summative test scored well on

the questionnaire. The students made the least use of the learning objectives.

Most of the students found the chapter length satisfactory (69 per cent). The question arose whether students with different educational backgrounds would evaluate long chapters differently. Students with less prior schooling had more objections concerning long chapters than students with more prior schooling.

The figures used in the margins of the text were given a positive rating (79 per cent).

The students were reasonably positive about the final examination; 69 per cent found that the questions posed on the examination met their expectations based on the questions on the diagnostic tests and the summative test. The final examination was considered representative for the subject matter by 75 per cent of the students. The students did, however, take advantage of the opportunity to comment on the examination. Their criticisms were specifically directed at the multiple-choice form of the exam.

In general the students felt that they had enough prior knowledge to understand the course. A quarter of the students judged their knowledge of biology and statistics as insufficient. There is a relation between educational level and the students' notion on their prior knowledge. No relation exists between educational level and students' assessment of the course level of difficulty.

Students assessed the level of difficulty as positive (92 per cent). A few sections of the course were judged too difficult

by the students, for example the section treating the biological aspects of behavior and sensory processes. In relative terms these sections were often cited as being impossible to comprehend without outside assistance. The group of students with less prior schooling and the group with more prior schooling scarcely differed in their assessment of the level of difficulty of the course.

The students were asked to estimate workload. They were first asked to indicate how much time they had spent on the sections they had already studied per section, and were then asked to indicate actual workload for the entire course. If we calculate the workload over the entire course, we reach an average of approximately 265 hours, which is 32 per cent higher than the nominal figure set for the course. The response to the second question also indicated that students amply exceeded the formal workload set for the course; 25 per cent of the students required one quarter more time than the designers had estimated.

A relatively large number of students did not view the audio-visual program (35 per cent). One third (34 per cent) of the students made use of all the different sections of it. Neither did many students make use of the audiocassette (40 per cent). Students who did make use of these sections were of the opinion that they did not learn a great deal from either the audio-visual program or the audiocassette.

Almost all of the students believed that the course did not require revision (90 per cent).

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insert Table 2 about here

Conclusion and Discussion

This article emphasizes the importance of a systematic approach to designing course material for adult distance education. The approach used by those who design and realize such course material should approximate the features of a systematic method.

We have applied the minimal strategy for systematic design in the development of a psychology course. We argue that courses as well as trainings in general would be more valuable if course designers used at least a minimal systematic design strategy (Tomic, 1991). Design strategies may naturally include a greater number of phases, and each phase may involve a greater number of activities. At the very least, however, a minimal design strategy should consist of the five phases described above.

It is concluded that the minimal strategy for systematic design activities is applicable to developing a psychology course. We argue that the value of courses would increase if developers used at least a minimal design strategy. Course designers would then be able to verify and repeat successful course designs.

We are naturally aware that our recommendation implies increasing the amount of time, the cost and the resources involved. The strategy we are recommending is desirable, but not always feasible.

We have conducted a formative evaluation of the course

described above by means of a questionnaire. The response to the questionnaire was not very great, probably because it was sent to the students shortly before the summer holidays.

Of those who did respond, one particular type of student was overrepresented. These students tended to be active on the labor market and their behavior is geared toward passing examinations. They have better positions on the labor market and believe that studying will improve their chances there. These characteristics likely influenced the evaluation of the course.

The students taking the course had relatively little schooling. In other words, half of them did not have tne educational background required for admission to traditional universities. There was a relation between educational level and whether or not the students believed they had enough background knowledge, but there was no relation between educational level and the students' assessment of the course level of difficulty.

The evaluation study demonstrated that the students generally assessed the course as positive on the questionnaire. There is therefore no need to alter the course in the near future.

A few remarks are in place, however. A considerable number of students prefer to see an integration of the textbook and the study guide. They would like to have the introduction, learning objectives, exercises, assignments, diagnostic tests, summative final test, and feedback included in the textbook. Students also prefer to have a final examination in the form of open ended questions. This is something to consider for introductory courses

now and in the future.

The designers anticipated the course level of difficulty, especially those parts with a high load of biological information. An audio-visual registration was made to clarify this particular part. The fact that a great many students do not use the audio-visual aids designed specifically for the course is food for thought. Developing this kind of material is time-consuming and very costly. The students who do use this material are not positive about its effectiveness. Unless due consideration and a specific didactic approach indicate otherwise, it makes no sense to increase the resources spent on developing audio-visual aids.

Finally, students are clearly exceeding the nominal workload set for the course.

Both the apparent underuse of presumably costly audio-visual aids and too much time spent on study by the respondents indicate that efficiency can be improved.

When the course is revised, the students' negative notions will be taken into consideration.

TABLE 1

Population, Sample and Response Rate

	N	Female	Male
Course population	1814	1197 (66%)	617 (34%)
Sample	400		
Response	238 (59%)		

TABLE 2

Student Judgement on Course Characteristics

	Mean Frequency	Median	SD
Course content	4.49	4.60	0.64
Course satisfied expectations	2.22	2.08	0.99
Arrangement of course material	4.42	4.49	0.66
Function of various sections of the course	4.34	4.35	0.64
Opportunity to monitor own progress in subject matter mastery	3.94	4.07	0.96
Use of self-instruction strategies	2.98	2.99	0.39
Extent of help provided by the student guide	3.99	4.12	0.97
Figures given in margins of text	4.08	4.20	0.88
Schema and content of glossary	3.83	3.91	0.91
Representativeness of final exam	3.75	3.98	1.17
Different parts of study guide	3.99	4.12	0.97
Chapter length	3.79	4.02	1.14
Use of subject related prior knowledge	3.99	4.14	0.91
Prior knowledge biology	3.90	4.03	0.99
Prior knowledge statistics	3.61	3.85	1.13
Course level of difficulty	3.03	3.02	0.25
Amount of learning from audio-visual aids	2.93	2.97	1.11
Amount of learning from audiocassette	2.57	2.56	1.09
Actual workload	2.83	2.58	1.17
Course content revision	1.90	1.95	0.29

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Appendix Vragenlijst aan studenten over cursus psychologie

Is uw oordeel over de inhoud van de cursus positief/negatief?	negatief 2	1	0	posi 1
Beantwoordt de inhoud cursus in hoge mate/in geringe mate aan de verwachtingen zoals u die vooraf had?	in hoge mate 2	1	0	ger 1
Is uw oordeel over de opzet van de cursus positief/negatief?	negatief 2	1	0	posi 1
Zijn de functies van de verschillende onderdelen van de cursus u voldoende/onvoldoende duidelijk?	onvoldoende 2	1	0	voldo 1
Bevat de cursus voldoende/onvoldoende vragen/opgaven/toetsen om voor uzelf na te gaan of u de leerstof beheerst?	onvoldoende 2	1	0	voldo 1
Vindt u de didactische bewerking van de leerstof (systematische opbouw, studeeraanwijzingen, opgaven e.d. te uitvoerig/goed/te beperkt?	te beperkt 2	goed 1	0	uitv 1
Vindt u het werkboek voldoende/onvoldoende hulp bieden bij de bestudering van de leerstof?	onvoldoende 2	1	0	voldo 1
Dragen de figuren in de marges van de hoofdstukken veel/weinig bij aan een beter begrip van de tekst?	weinig 2	1	0	1
Is uw oordeel over de opzet en inhoud van het glossarium positief/negatief?	negatief 2	1	0	posi 1
Bevat het tentamen wel/niet de vragen die u op grond van de samenvattingen, zelftoetsen en eindtoets kon verwachten?	niet 2	1	0	1
Heeft u bij de bestudering van de hoofdstukken gebruik gemaakt van de volgende onderdelen in het werkboek (introductie, leerdoelen, studeeraanwijzingen, zelftoetsvragen)	bijna nooit 1	soms 2		bijna altijd 3
Levert het voor u geen/veel problemen op dat de hoofdstukken meestal te omvangrijk zijn om in een keer in zijn geheel te bestuderen?	veel problemen 2	1	0	probl 1
Is uw voorkennis voldoende/onvoldoende om deze cursus te kunnen volgen?	onvoldoende 2	1	0	voldo 1
Voorkennis biologie	onvoldoende 2	1	0	voldo 1

Voorkennis statistiek	onvoldoende voldo 2 1 0 1
Is de moeilijkheidsgraad van de cursus voor u te hoog/goed/te laag?	te laag goed te 2 1 0 1
Hebt u veel/weinig geleerd van de audiovisuele programma's?	weinig 2 1 0 1
Heeft u veel/weinig geleerd van de audiocassette?	weinig 2 1 0 1
Feitelijk gerealiseerde/geschatte studielast	1 minder dan formee 2 gelijk aan formee 3 ove rschrijding < 25% 4 ove rschrijding tussen 25 3n 50% 5 ove rschrijding > 50%
Moet de cursus, zoals deze thans door de OU wordt aangeboden, naar uw mening vakinhoudelijk worden gewijzigd? (Indien ja, graag aanduiden waarom).	ja ==

het is een 5-punts schaal, van negatief naar positief, dus: 1, 2, 3, 4, 5.